Remarks

The Examiner is thanked for the review of the patent application. Claims 1, 9, 17, 20 and 23-27 have been amended. Applicants respectfully submit that the amendments to the aforementioned claims are of a clarifying nature and do not add new matter. Claims 1, and 7-28 are pending.

Rejections under 35 U.S.C. § 112

Claims 9 and 27 have been amended to provide proper antecedent basis. Therefore, Applicants respectfully request that the section 112 rejection be withdrawn.

Rejections under 35 U.S.C. § 103

Claims 1 and 7-20 were rejected under 35 U.S.C. 103(a) as being unpatentable over Gun et al. (U.S. Patent No. 5,777,984)("Gun") in view of Caldara et al. (U.S. Patent No. 5,748,629)("Gun") and McClure et al. (U.S. Patent No. 5,790,770)("McClure"). The rejection and the assertions made by the Office are respectfully traversed. As shown below, the cited prior art references do not disclose or suggest all of the features of the claimed inventions. Therefore, Applicants respectfully submit that the Office has failed to present a prima facie case of obviousness as required by section 103.

For the sake of brevity, not all of the many differences between the cited prior art references and the claimed invention will be discussed. Independent claims 1, 17, and 20 include the features of at least one input switch access port structure and a switch element. Independent claims 1 and 20 further include the feature of at least one output arbitration structure, and independent claims 17 and 20 include the feature of at least one output switch access port structure. Applicants respectfully submit that, at the very least, the cited prior art references do not disclose all of these features.

Gun discloses a method to control a user source transmission cell rate and teaches use of a cell-based network for transmitting cells where user source end systems (SES) send data to a user destination end systems (DES) over a switch. The switch of Gun includes an ATM port connected to an ingress switch port and an egress switch port which are both connected to a switch fabric. Gun also shows a cell memory with one set of per VC queues. In contrast, the claimed invention as claimed in claims 1, 17, and 20 includes at least one input switch access port structure including a plurality of input back pressure buffer structures configured to allow input back pressuring to be accomplished on a per-virtual connection basis. In addition, the switch element of the claimed invention includes the feature of a plurality of buffer structures capable of output buffering on per-virtual connection basis. Applicants respectfully submit that Gun does not disclose or suggest these features.

The Office has suggested that the ingress switch port with the cell memory as recited in Gun discloses the feature of the input switch access port having a plurality of buffer structures configured to allow back-pressuring to be accomplished on a per-virtual connection basis. Applicants respectfully traverse this suggestion. The ingress switch port of Gun includes a cell memory with per-VC queues which are structured so the cell memory may be monitored for congestion by cell memory controller. (See Figure 8 of Gun and accompanying description) The cell memory controller keeps track of the total number of ATM user cells in the per-VC queues. Therefore, the ingress switch port appears to require additional structures such as the cell memory controller and the ingress context memory to manage congestion. Thus, Gun uses a feedback system to reduce data transmission when congestion is detected. Consequently, Applicants respectfully submit that this is indicative that Gun does not manage data transmission using input back pressuring on a per-virtual connection basis. Therefore, Applicants respectfully submit that Gun does not disclose or suggest the feature of at least one input switch access port structure including a plurality of input back pressure buffer

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structures configured to allow input back pressuring to be accomplished on a per-virtual connection basis. Applicants further submit that the switch element includes the feature of a plurality of buffers configured to allow buffering to take place on a per-virtual connection basis. Applicants respectfully submit that according to Figure 8 in Gun, Gun does not disclose a switch element having the plurality of buffer structures.

In addition, Applicants respectfully submit that Gun does not teach usage of multiple sets of buffers where buffering can occur in each of an input switch access port, a switch element, and an output switch access port. Therefore, with respect to claims 17 and 20, Applicants respectfully submit that the cited portions of Gun do not disclose or suggest a structure such as an output switch access port structure connected to the switch element that is configured for output buffering on a per-virtual connection basis.

With respect to claims 1 and 20, the Office has stated that Gun does not disclose or suggest the output arbitration structure. Therefore, for at least the reasons discussed above, Applicants respectfully submit that Gun does not disclose or suggest all of the features as claimed in each of independent claims 1, 17, and 20.

Caldara is directed towards a method of using certain linked list structure to control a switch which includes an input port processor, a bandwidth arbiter, and an output port processor, for switch bandwidth scheduling for cell transfers from the input port processor and for output link scheduling at the output port processor. The Office cites Figure 1 reference number 12 (the bandwidth arbiter) of Caldara as disclosing an output arbitration structure. Applicants respectfully traverse this suggestion. Applicants respectfully submit that Caldara teaches, for example at Figure 6 and at column 8, line 65 - column 9, line 7, the dynamic assignment of cells by the bandwidth arbiter of that invention. The cited reference appears to require the dynamic allocation of bandwidth by the bandwidth arbiter which effectively "looks" for an open port on the "From Switch Port Processor" (FSPP) side, and

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then dynamically assigns the cell from the "To Switch Port Processor (TSPP) side to that open port. This dynamic port assignment, requires additional structures, for instance the bandwidth arbiter, to effect the switching of cells. Therefore, Caldara requires the use of a the TSPP and the use of the FSPP to organize inputted cells. The TSPP structure is responsible for transferring the cell from a buffer to an FSPP by use of a bandwidth arbiter. The bandwidth arbiter actively matches available receivers to transmitters needing to transmit cells to the receivers and determines what bandwidth is available. In contrast, the claimed invention does not require the combination of a "bandwidth arbiter," a "TSPP," and an "FSPP." Therefore, the Applicants respectfully submit that the bandwidth arbiter of Caldara does not disclose or suggest the output arbitration structure as claimed herein. In addition, Applicants respectfully submit that Caldara does not disclose or suggest the other features of the claimed invention as discussed in above in reference to Gun.

The McClure reference teaches usage of a switch feedback signal which includes data reflecting the status of an output queue from a receiving node to a sending node. The Office has cited column 6, lines 10-20 of McClure as disclosing an input back pressure structure. Applicants respectfully traverse this suggestion. Column 6, lines 10-20 of McClure states as follows:

> In this embodiment, the input queue 16 and output queues 20 are assigned to traffic type groups in order to provide traffic flow control if shared resources are being utilized. By assigning a unique queue per connection, flow control can then be implemented on a per connection basis. Flow control can also be implemented on a per traffic type basis. Flow control can also be implemented on a per connection basis. In addition, nested queues of queues may be employed to provide per traffic type, per connection flow control. As discussed above, each connection is assigned bandwidth based upon the traffic type associated with the connection.

The above passage in McClure refers to the teachings of sending a signal from an output queue to an input queue so the input queue can actively prevent transmission of further cells. As can be seen, McClure generically discusses flow control using the feedback signal system

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on a per connection basis and only shows a generic diagram with set of input queues connected to a switching fabric which in turn is connected to a set of output queues (See McClure Fig. 2). Applicants respectfully submit that because McClure teaches usage of a dedicated signal from the output queue to the input queue to stop sending data when the output queue is full to achieve flow control, McClure does not teach usage of input back pressure as claimed herein. Therefore, Applicants respectfully submit that the portion of McClure cited by the Office does not disclose or suggest a structure of a data switch with both a input switch access port structure that has both input back pressure buffer structures and a switch element with buffer structures configured to allow buffering on a per-virtual connection basis. Therefore, it would also follow that McClure does not disclose or suggest additional buffering by an output switch access port configured to output buffer on a per-virtual connection basis.

Applicants also submit that McClure does not disclose or suggest an output arbitration structure because McClure does not disclose or suggest circuitry for arbitrating access to a single output port of said plurality of output ports. As a result, Applicants respectfully submit that the cited prior art references, individually or in combination, do not disclose or suggest all of the features of the claimed invention as claimed in independent claims 1, 17, and 20. In addition, the dependent claims are submitted to be patentable for at least the same reasons as independent claims 1, 17, and 20 are patentable over the cited art of record.

Claim 21 was rejected under 35 U.S.C. 103(a) as being unpatentable over Gun, McClure, and Caldara as applied to claim 17 and further in view of Chiussi (U.S. Patent No. 5,689,500). This rejection and the assertions made by the Office are respectfully traversed. As discussed above, Gun, McClure, and Caldara do not disclose all of the features of claim 17. Applicants respectfully submit that Chiussi does not remedy the deficiencies of the other

cited prior references. Therefore, Applicants submit that the cited prior art references, individually or in combination do not disclose or suggest all of the features of claim 21.

Claims 22-23 and 26-27 were rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuboi (U.S. Patent No. 5,140,582)("Tsuboi"). The rejection is respectfully traversed. As further discussed below, Tsuboi does not disclose or suggest all of the features of the claimed invention as required to present a prima facie case of obviousness as required in a section 103 rejection.
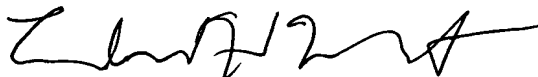
Tsuboi teaches a generic switch that includes a scheduler which receives idle/busy information from the packet buffers. (See, Figures 2 and 3 of Tsuboi and corresponding descriptions) The idle/busy information reflects the status of the packet buffers. Therefore, the information received by the scheduler is not the packet being transmitted by the switch of Tsuboi. In contrast to the scheduler as defined by Tsuboi, the scheduler as claimed herein is capable of receiving data being transmitted through the switch element. In addition, the scheduler as claimed herein is capable of receiving the data through the switch matrix. Therefore, Applicants respectfully submit that Tsuboi does not disclose or suggest a plurality of schedulers for receiving the data from the plurality of buffers through the switch matrix. In addition, Applicants respectfully disagrees with the Office's suggestion that it would have been obvious to apply a bus into a switch for establishing a link between the devices via a switch matrix. Applicants respectfully submit that Tsuboi does not appear to support such a suggestion. Therefore, Applicants respectfully request a cite to a reference which supports the Office's suggestion. Consequently, Applicants respectfully submit that Tsuboi does not disclose or suggest all of the features of independent claim 22. In addition, the dependent claims are submitted to be patentable for at least the same reasons as independent claim 22 is patentable over the cited art of record.

Allowable Claims

The Office has indicated that claim 28 is allowed. The Office has further stated that claims 24 and 25 would be allowable if rewritten in independent form with all of the features of the base claim and any intervening claims. Claims 24 and 25 were amended to correct a typographical error. Applicants respectfully submit that claims 24 and 25 are allowable for at least the same reasons as claim 22 is patentable over the cited prior art.

The Applicants respectfully submit that all of the pending claims are in condition for allowance. Accordingly, a notice of allowance is respectfully requested. If the Examiner has any questions concerning the present amendment, the Examiner is kindly requested to contact the undersigned at (408) 749-6900. If any additional fees are due in connection with filing this amendment, the Commissioner is also authorized to charge Deposit Account No. 50-0805 (Order No. COREP002D).

Respectfully submitted,
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